

## GENERAL INFORMATION

The front suspension is a McPherson strut with coil spring. The shock absorber is gas-filled hydraulic double-acting type.

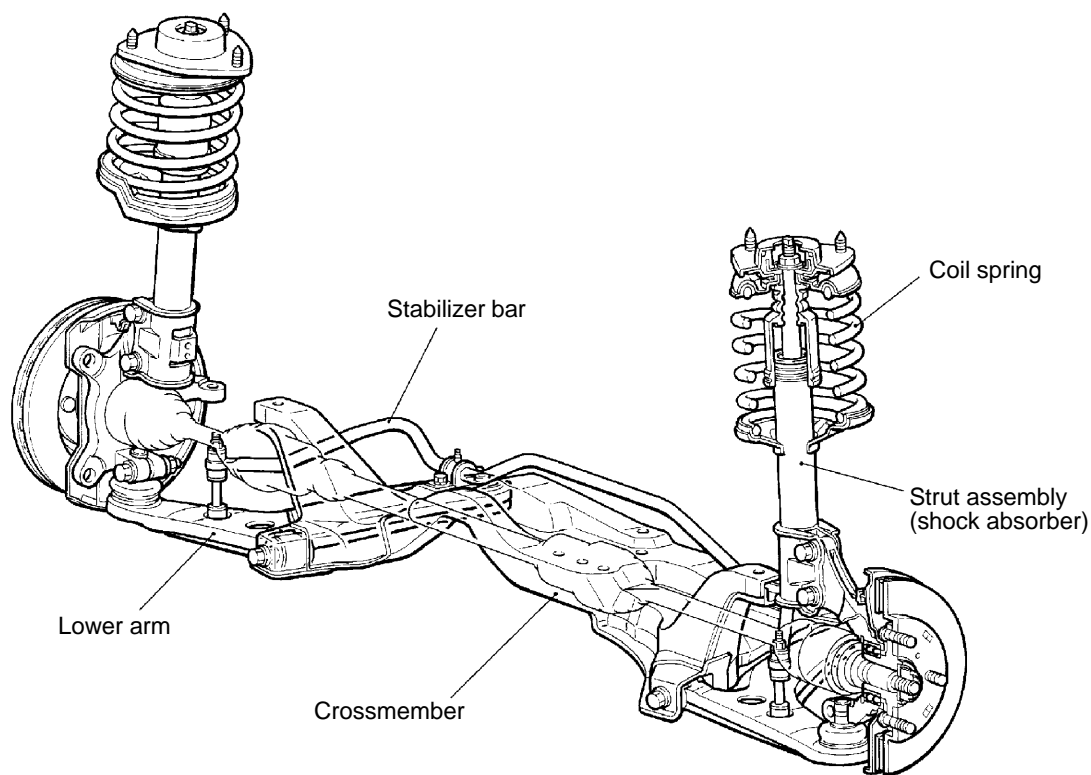
### COIL SPRING

| Item  | Specification                              |  |
|---|--|--|
|   | GLX , EXCEED                               | VR-X                                       |
| Wire diameter × average diameter × free length mm | <M/T>12 × 138 × 331<br><A/T>12 × 138 × 340 | <M/T>13 × 160 × 354<br><A/T>14 × 160 × 363 |

### STABILIZER BAR

| Item             | Specification |
|------------------|---------------|
| Wire diameter mm | 25            |

### CONSTRUCTION DIAGRAM



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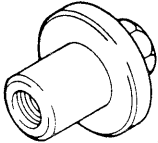
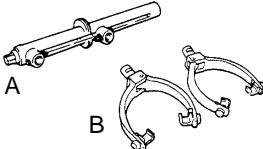
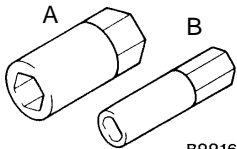
# SERVICE SPECIFICATIONS

| Items   |                                | Standard value                     |                                    |
|---|--------------------------------|------------------------------------|------------------------------------|
|   |                                | Standard suspension                | High-ground suspension             |
| Toe-in  | At the centre of tyre tread mm | $1 \pm 2$                          | $1 \pm 2$                          |
|   | Toe-angle (per wheel)          | $0^{\circ} 03' \pm 06'$            | $0^{\circ} 03' \pm 06'$            |
| Toe-out angle on turns<br>(inner wheel when outer wheel at $20^{\circ}$ ) |                                | $21^{\circ} 42'$                   | $21^{\circ} 36'$                   |
| Steering angle  | Inner wheel                    | $40^{\circ} 40' \pm 1^{\circ} 30'$ | $40^{\circ} 40' \pm 1^{\circ} 30'$ |
|   | Outer wheel (for reference)    | $33^{\circ} 20'$                   | $33^{\circ} 20'$                   |
| Camber  |                                | $0^{\circ} 00' \pm 30'^*$          | $0^{\circ} 10' \pm 30'^*$          |
| Caster  |                                | $2^{\circ} 50' \pm 30'^*$          | $2^{\circ} 40' \pm 30'^*$          |
| Side slip mm (per 1 m)  |                                | $0 \pm 3$                          | $0 \pm 3$                          |
| Kingpin inclination   |                                | $12^{\circ} 35' \pm 1^{\circ} 30'$ | $12^{\circ} 20' \pm 1^{\circ} 30'$ |
| Lower arm ball joint rotation starting torque N·m                         |                                | $0 - 3.9$                          | $0 - 3.9$                          |
| Protruding length of stabilizer bar mounting bolt mm                      |                                | $20.5 - 23.5$                      | $20.5 - 23.5$                      |

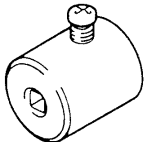
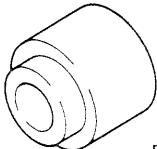
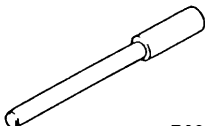
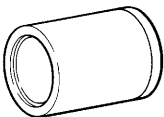
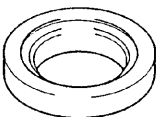
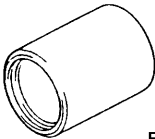
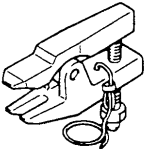
## NOTE

\*: difference between right and left wheels: less than  $30'$

# SPECIAL TOOLS

| Tools   | Number                                 | Name                                    | Use   |
|---|--|---|---|
| <br>B991004            | MB991004                               | Wheel alignment gauge attachment        | Wheel alignment measurement<br><Vehicles with aluminium wheels> |
| <br>A<br>B<br>00003796 | A: MB991237<br>B: MB991238             | A: Spring compressor body<br>B: Arm set | Coil spring compression   |
| <br>A<br>B<br>B991680  | MB991680<br>A: MB991681<br>B: MB991682 | Wrench set<br>A: Wrench<br>B: Socket    | Strut assembly disassembly and reassembly                       |

## 33A FRONT SUSPENSION BASE – Special Tools

| Tools  | Number                               | Name                                 | Use   |
|--|--------------------------------------|--------------------------------------|---|
| <br>B991006   | MB991006                             | Preload socket                       | Lower arm ball joint rotation starting torque measurement |
| <br>B990800   | MB990800                             | Ball joint remover & installer       | Lower arm ball joint dust cover press-in                  |
| <br>B990883   | MB990883                             | Rear suspension bushing arbor        | Lower arm bushing removal and press-fitting               |
| <br>B990971   | MB990971                             | Rear wheel bearing & installer joint |   |
| <br>B990884  | MB990887                             | Ring                                 |   |
| <br>B990890 | MB990890                             | Rear suspension bushing base         |   |
| <br>B991113 | MB990635,<br>MB991113<br>MB991406 or | Steering linkage puller              |   |
|  |                                      |                                      | Tie rod end and knuckle disconnection                     |

MAIN

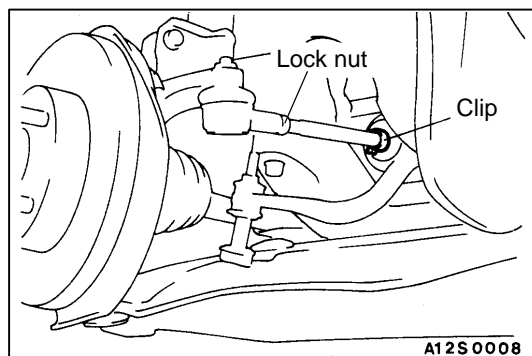
Group  
33A

## ON-VEHICLE SERVICE

### WHEEL ALIGNMENT CHECK AND ADJUSTMENT

Measure the wheel alignment with the vehicle parked on a level surface.

The front suspension, steering system, and wheels should be serviced to normal condition prior to measurement of wheel alignment.



#### TOE-IN

##### Standard value:

**At the centre of tyre tread**  $1 \pm 2$  mm

**Toe angle (per wheel)**  $0^{\circ}03' \pm 06'$

1. Adjust the toe-in by undoing the clip and lock nut, and turning the left and right tie rod turnbuckles by the same amount (in opposite directions).

##### NOTE

The toe will move out as the left turnbuckle is turned toward the front of the vehicle and the right turnbuckle is turned toward the rear of the vehicle.

2. Install the clip and tighten the lock nut to the specified torque.

**Tightening torque:**  $40 \pm 5$  N·m

3. Confirm that the toe-in is at the standard value.
4. Use a turning radius gauge to check that the steering angle is at the standard value.

##### Standard value:

|                              |                                  |
|------------------------------|----------------------------------|
| Inner wheels                 | $40^{\circ}40' \pm 1^{\circ}30'$ |
| Outer wheels (for reference) | $33^{\circ}20'$                  |

#### TOE-OUT ANGLE ON TURNS

To check the steering linkage, especially after the vehicle has been involved in an accident or if an accident is presumed, it is advisable to check the toe-out angle on turns in addition to the wheel alignment.

Conduct this test on the left turn as well as on the right turn.

##### Standard value:

| Items  | Standard suspension | High-ground suspension |
|--|---------------------|------------------------|
| Toe-out angle on turns (inner wheel when outer wheel at $20^{\circ}$ ) | $21^{\circ}42'$     | $21^{\circ}36'$        |

## CAMBER, CASTER AND KINGPIN INCLINATION

Standard value:

| Items               | Standard suspension | High-ground suspension |
|---------------------|---------------------|------------------------|
| Camber              | 0°00' ± 30'         | 0°10' ± 30'            |
| Caster              | 2°50' ± 30'         | 2°40' ± 30'            |
| Kingpin inclination | 12°35' ± 1°30'      | 12°20' ± 1°30'         |

### NOTE

1. \*: difference between right and left wheels must be less than 30'
2. For vehicles with aluminium wheels, attach the camber/caster/kingpin gauge by using a compensator or special tool (MB991004). The special tool (MB991004) must be tightened to the drive shaft to the same torque  $226 \pm 49$  N·m as the drive shaft nut.

### Caution

To prevent the wheel bearing from damage, never subject the wheel bearings to the vehicle load when the drive shaft nuts are loosened.

3. Camber and caster are preset at the factory and cannot be adjusted.

## SIDE SLIP

Measure the side slip with a side slip tester.

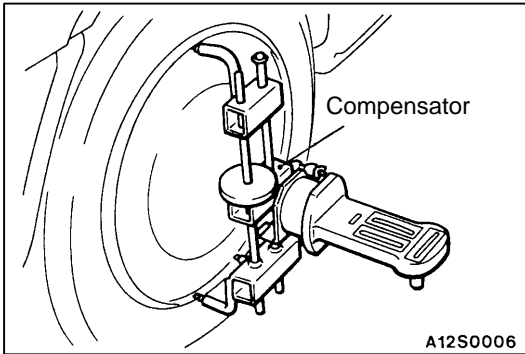
**Standard value: 0 ± 3 mm (per 1m)**

## BALL JOINT DUST COVER CHECK

1. Check the dust cover for cracks or damage by pushing it with finger.
2. If the dust cover is cracked or damaged, replace the lower arm assembly.

### NOTE

Cracks or damage of the dust cover may cause damage of the ball joint.



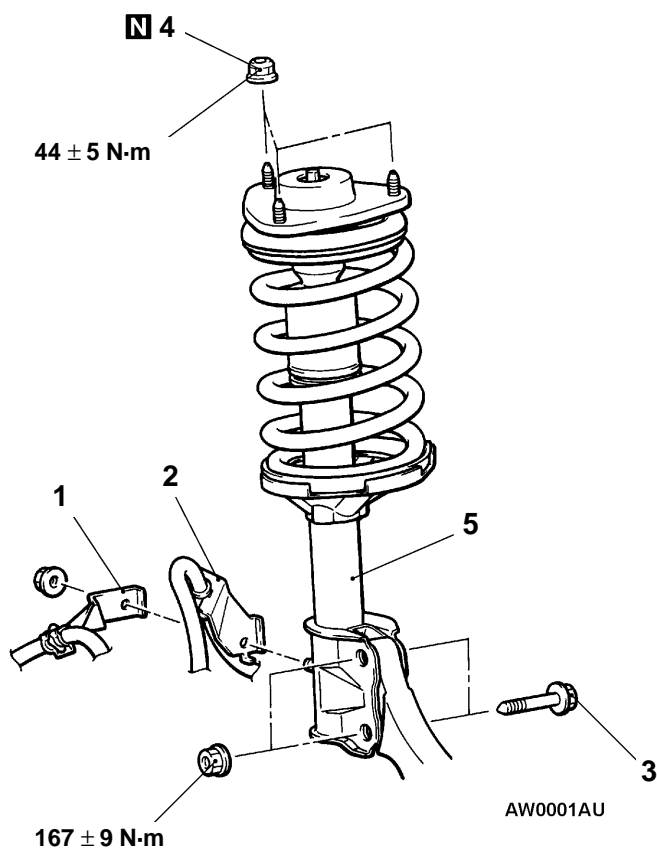
## STRUT ASSEMBLY

### REMOVAL AND INSTALLATION

**Post-installation Operation**  
Wheel alignment check and adjustment

MAIN

Group  
33A



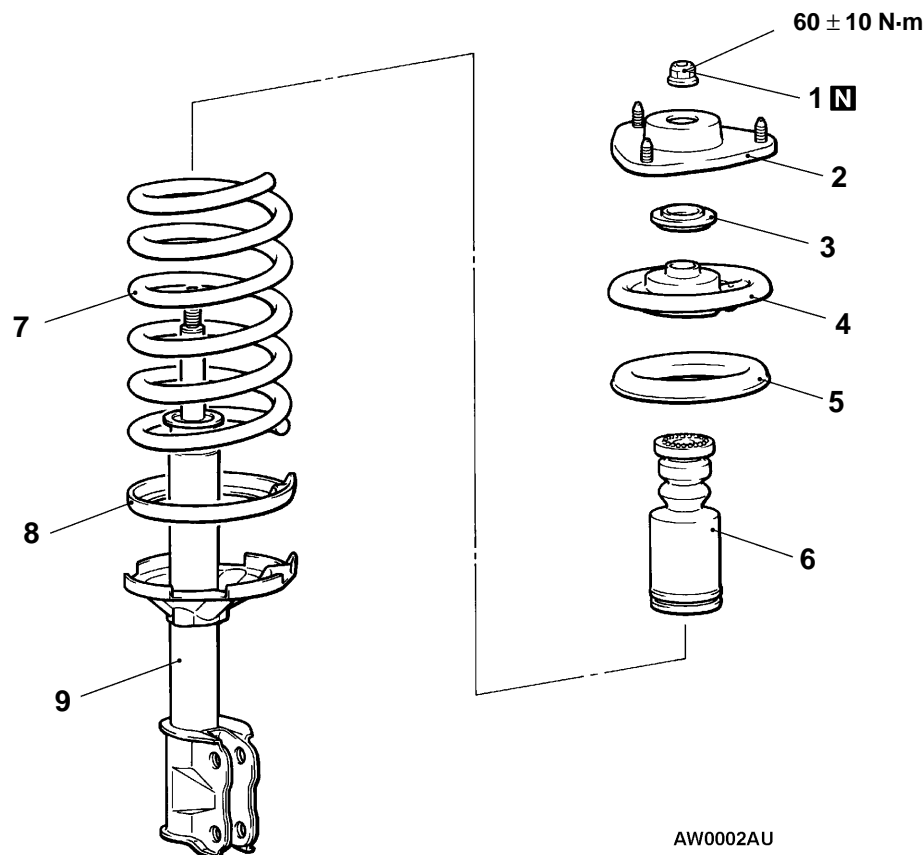
#### Removal steps

1. Front wheel speed sensor harness bracket <Vehicles with ABS>
2. Brake hose bracket
3. Knuckle connection
4. Strut mounting nut
5. Strut assembly

## DISASSEMBLY AND REASSEMBLY

MAIN

Group  
33A



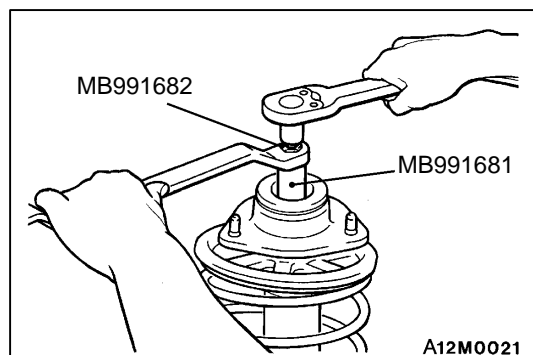
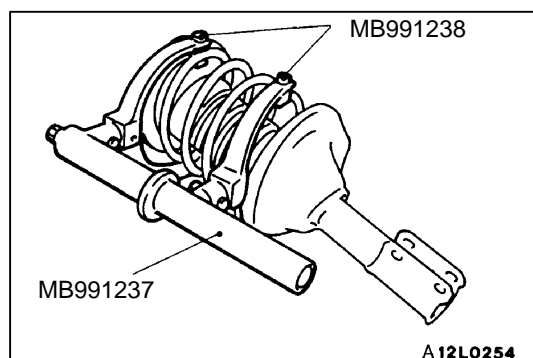
### Disassembly steps



1. Self-locking nut
2. Strut insulator assembly
3. Bearing
4. Upper spring seat
5. Upper spring pad



6. Bump rubber
7. Coil spring
8. Lower spring pad
9. Strut assembly



## DISASSEMBLY SERVICE POINTS

### ◀A▶ SELF-LOCKING NUT REMOVAL

1. Use the special tools to compress the coil spring.

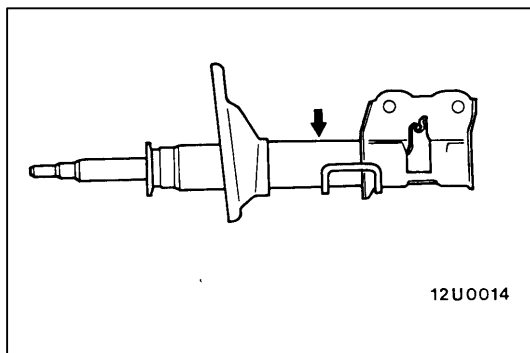
#### Caution

- (1) Do not tighten the special tool bolt too tight. The special tool will be broken if the allowable tightening torque of 74 N·m is exceed.
- (2) Install the special tools evenly, and so that the maximum length will be attained within the installation range.
- (3) Do not use an impact wrench as it will cause the bolt of the special tool to be seized.

2. Using the special tools, loosen the self-locking nut.

#### Caution

To prevent the piston rod lock nut inside the strut from loosening, do not use an impact wrench when the self-locking nut is loosened.



## ◀B▶ STRUT ASSEMBLY REMOVAL

To discard the strut assembly, place the assembly horizontally with its piston rod extended. Then drill a hole approx. 3 mm in diameter at the location shown in the illustration and discharge the gas.

### Caution

The gas itself is harmless but it may issue out of the hole together with chips generated by the drill. Therefore, be sure to wear goggles.

## REASSEMBLY SERVICE POINT

### ▶A◀ SELF-LOCKING NUT INSTALLATION

1. Ensure that the bearing is seated correctly.
2. Install the special tool to the strut assembly same as its removal.
3. While the coil spring is being compressed by the special tools, provisionally tighten the self-locking nut.

### Caution

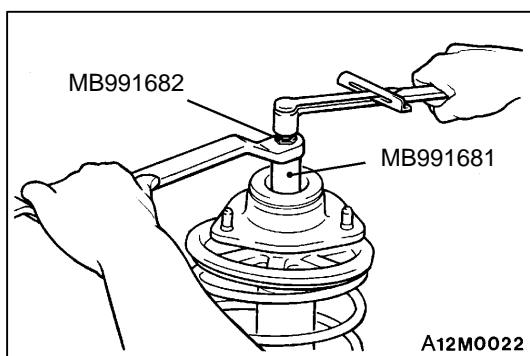
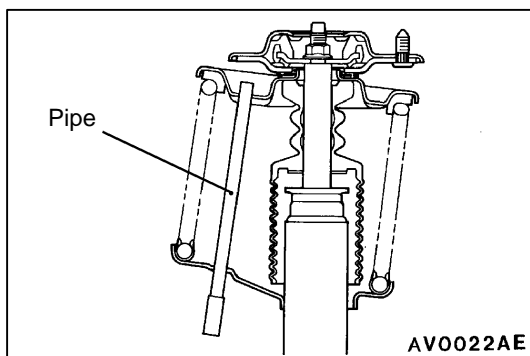
**Do not use an impact wrench as it will cause the bolt of the special tool to be seized.**

4. Align the hole in the strut assembly lower spring seat with the hole in the upper spring seat.

### NOTE

Using a pipe as shown facilitates the alignment.

5. Correctly align both ends of the coil spring with the grooves in the spring seat, and then loosen the special tools.



6. Using the special tools, tighten the self-locking nut to the specified torque.

**Specified torque:  $60 \pm 10$  N·m**

### Caution

**To prevent the piston rod lock nut inside the strut from loosening, do not use an impact wrench when the self-locking nut is tightened.**



# LOWER ARM ASSEMBLY

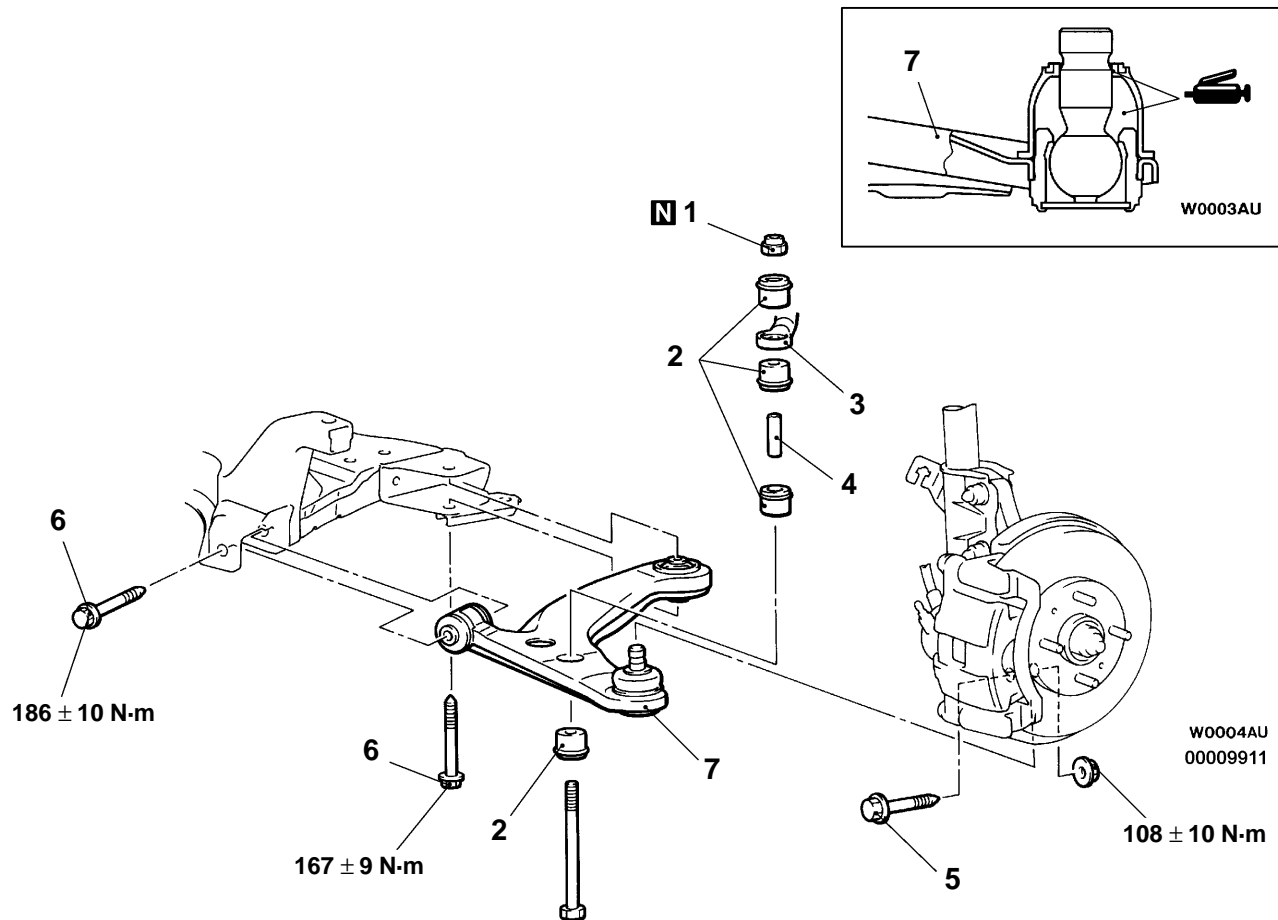
## REMOVAL AND INSTALLATION

### Caution

\*: To prevent bushings from breakage, the parts indicated by \* should be temporarily tightened, and then fully tightened with the vehicle on the ground in the unladen condition.

#### Post-installation Operation

- Check the dust cover for cracks or damage by pushing it with finger.
- [Wheel alignment check and adjustment](#)



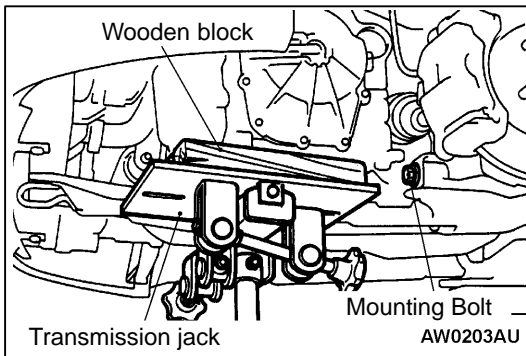
### Removal steps



1. Self-locking nut
2. Stabilizer rubber
3. Stabilizer bar
4. Collar



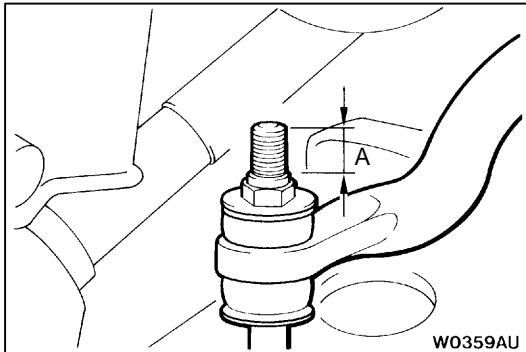
5. Lower arm and knuckle connection
6. Lower arm and crossmember connection
7. Lower arm assembly



## REMOVAL SERVICE POINT

### ◀A▶ LOWER ARM AND CROSSMEMBER DISCONNECTION

Lift the transmission with a transmission jack, and then withdraw the front mounting bolt on the left lower arm assembly.

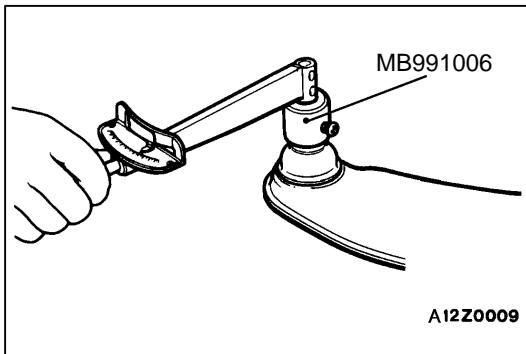


## INSTALLATION SERVICE POINT

### ▶A◀ SELF-LOCKING NUT INSTALLATION

Tighten the self-locking nut until the bolt protruding length meets the standard value.

**Standard value (A): 20.5 – 23.5 mm**



## INSPECTION

### LOWER ARM BALL JOINT ROTATION STARTING TORQUE CHECK

1. After shaking the ball joint stud several times, use the special tool to measure the rotation starting torque of the lower arm ball joint.

**Standard value: 0 – 3.9 N·m**

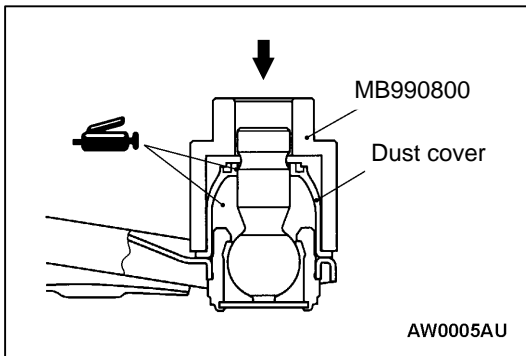
2. When the measured value exceeds the standard value, replace the lower arm assembly.
3. When the measured value is lower than the standard value, check that the lower arm ball joint turns smoothly without excessive play. If there is no excessive play, the ball joint can be reused.

### LOWER ARM BALL JOINT DUST COVER CHECK

1. Check the dust cover for cracks or damage by pushing it with finger.
2. If the dust cover is cracked or damaged, replace the lower arm assembly.

#### NOTE

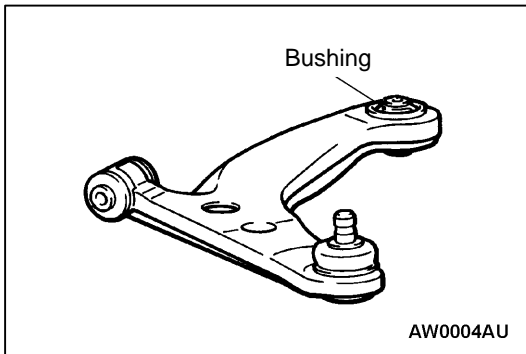
If the dust cover is cracked or damaged, it is possible that there may also be damage to the ball joint. When it is damaged during service work, replace the dust cover.



### LOWER ARM BALL JOINT DUST COVER REPLACEMENT

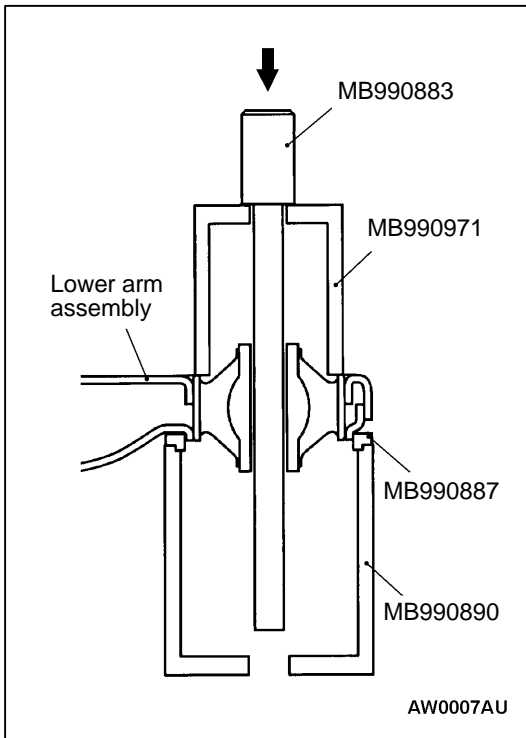
Only when the dust cover is damaged accidentally during service work, replace the dust cover as follows:

1. Remove the dust cover.
2. Apply multipurpose grease to the lip and inside of the dust cover.
3. Using the special tool, press the dust cover until it contacts the lower arm assembly.
4. Press the dust cover with your finger to check that there are no cracks or damage in the dust cover.

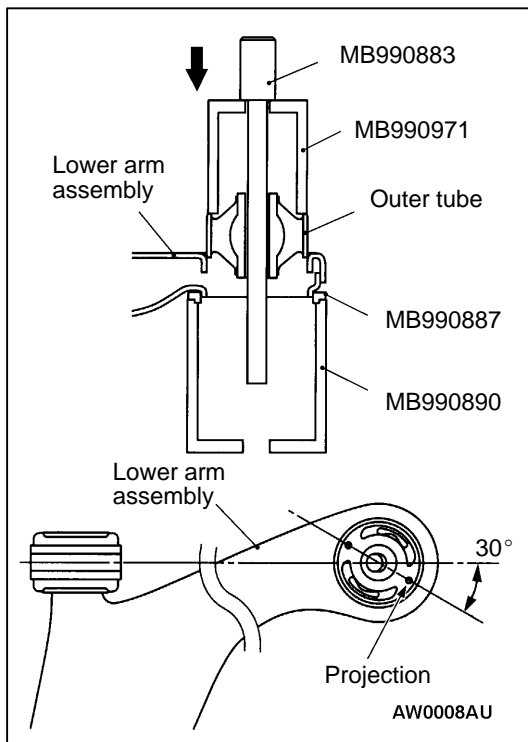


### LOWER ARM BUSHING REPLACEMENT

Replace the bushing as follows:



1. Use the special tools to drive out the bushing.



2. Position the bushing so that its projection is as shown, and then use the special tool to press in the bushing.
3. Press the bushing until its outer tube is flush with the lower arm assembly surface.

## STABILIZER BAR

### REMOVAL AND INSTALLATION

#### Caution

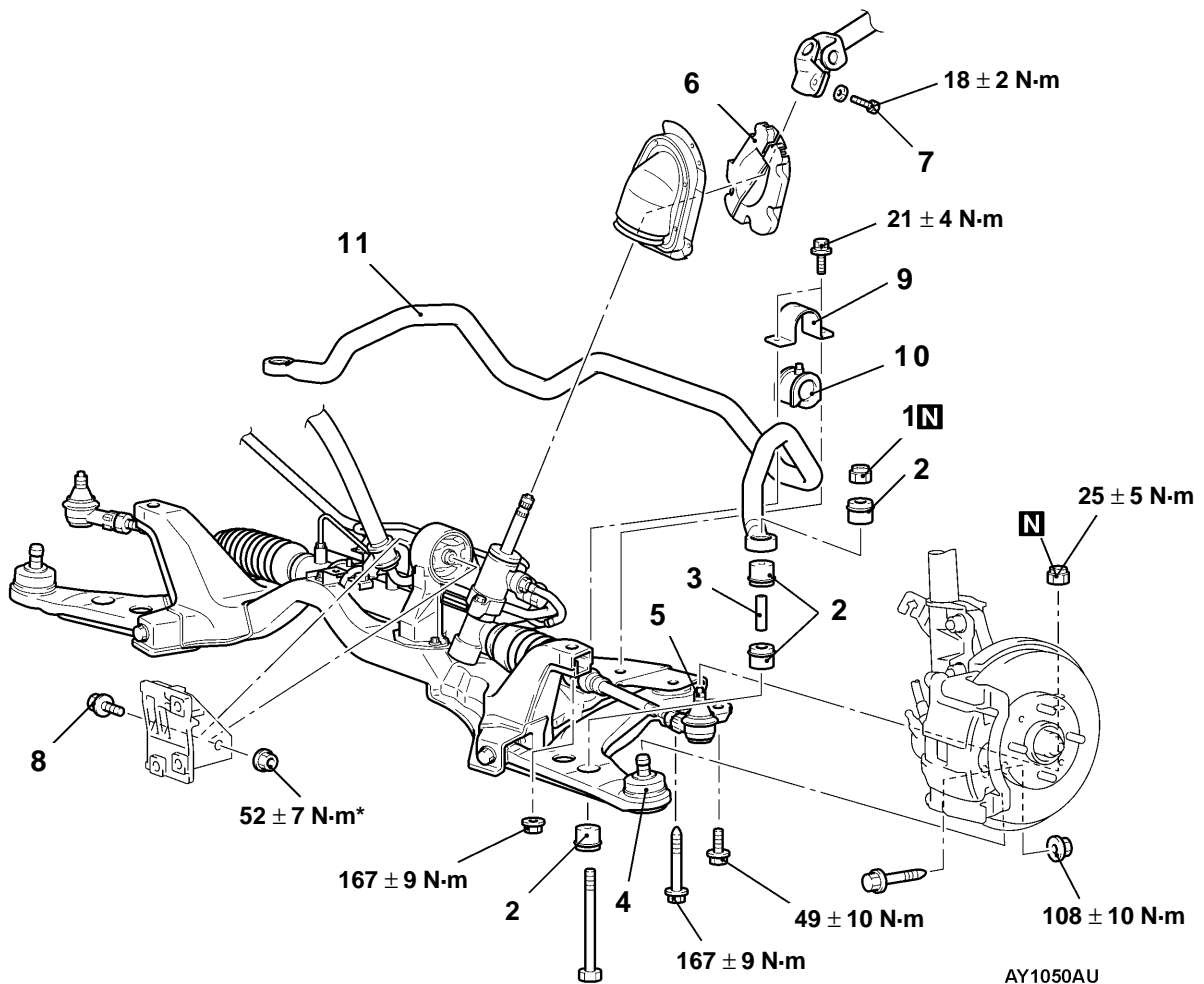
1. Before removing the steering wheel and air bag module assembly, refer to [Service Precautions](#) and [Air Bag Module and Clock Spring](#). Also, put the front wheels in straight-ahead position. Failure to do so may damage the SRS clock spring and render the SRS air bag inoperative, which results serious driver injury.
2. To prevent bushings from breakage, the parts indicated by \* should be temporarily tightened, and then fully tightened with the vehicle on the ground in the unladen condition.

#### Pre-removal Operation

- [Steering Wheel and Air Bag Module Assembly Removal](#)
- [Clock Spring Removal](#)
- [Centermember Removal](#)
- [Front Exhaust Pipe Removal](#)

#### Post-installation Operation

- [Front Exhaust Pipe Installation](#)
- [Centermember Installation](#)
- [Clock Spring Installation](#)
- [Steering Wheel and Air Bag Module Assembly Installation](#)
- Check the Dust Cover for Cracks or Damage by Pushing it with Finger.
- Checking Steering Wheel Position with Wheels Straight Ahead
- [Front Wheel Alignment Check and Adjustment](#)



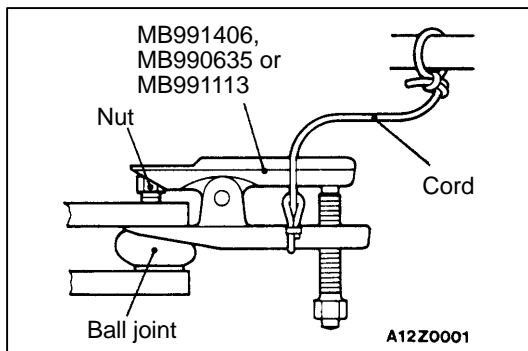
## Removal steps



1. Self-locking nut
2. Stabilizer rubber
3. Collar
4. Lower arm and knuckle connection
5. Tie rod end and knuckle connection
6. Steering shaft cover



7. Steering gear and joint connecting bolt
8. Rear roll stopper connecting bolt
9. Fixture
10. Bushing
11. Stabilizer bar

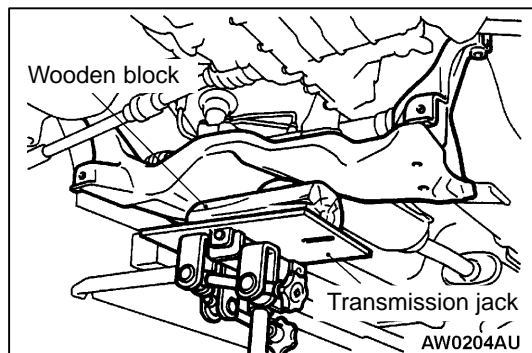


## REMOVAL SERVICE POINTS

### ◀A▶ TIE ROD END AND KNUCKLE DISCONNECTION

#### Caution

1. To prevent the ball joint thread from damage, the tie rod end mounting nut must be only loosened but not removed from the ball joint. Be sure to use the special tool.
2. Support the special tool with a cord to prevent it from coming off.



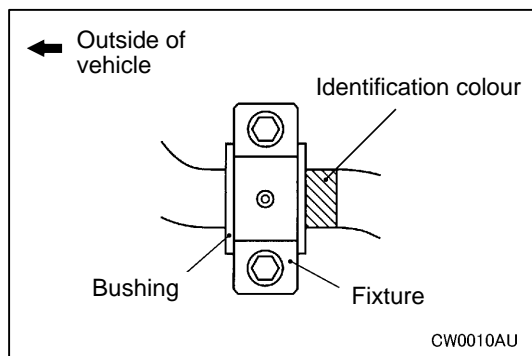
## ◀B▶ FIXTURE/BUSHING/STABILIZER BAR REMOVAL

Carry out the following operations to ensure working space in order to remove the fixture, the bushing and the stabilizer bar.

1. Use a transmission jack to hold the crossmember, and then remove the crossmember mounting nuts and bolts.
2. Lower the crossmember until the fixture, the bushing and the stabilizer bar can be removed.

### Caution

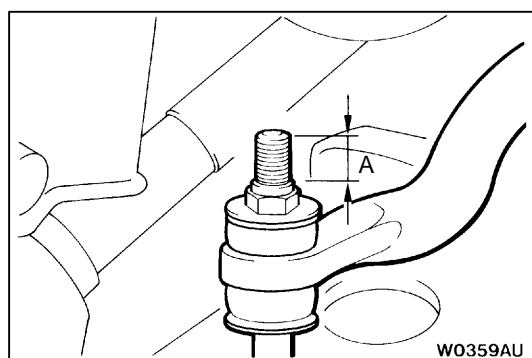
**Be careful not to lower the crossmember excessively, otherwise the power steering return hose bracket may deform.**



## INSTALLATION SERVICE POINTS

### ▶A◀ STABILIZER BAR/BUSHING/FIXTURE INSTALLATION

Align the stabilizer bar identification mark with the right end of the bushing.



### ▶B◀ SELF-LOCKING NUT INSTALLATION

Tighten the self-locking bolt until its protruding length meets the standard value.

**Standard value (A): 20.5 – 23.5 mm**